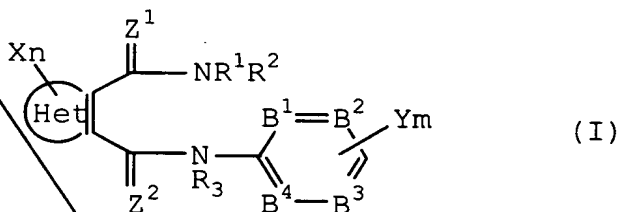


CLAIMS

1. A heterocyclic dicarboxylic acid diamide derivative represented by the general formula (I):



{wherein R^1 , R^2 and R^3 , which may be the same or different, are hydrogen atoms, (C_3-C_6) cycloalkyl groups, halo (C_3-C_6) cycloalkyl groups or $-A^1-(R^4)_r$ (wherein A^1 is a (C_1-C_8) alkylene group, a (C_3-C_6) alkenylene group or a (C_3-C_6) alkynylene group, R^4 , which may be the same or different, are hydrogen atoms; halogen atoms; cyano groups; nitro groups; halo (C_1-C_6) alkyl groups; (C_3-C_6) cycloalkyl groups; halo (C_3-C_6) cycloalkyl groups; (C_1-C_6) alkoxycarbonyl groups; di (C_1-C_6) alkoxyphosphoryl groups whose (C_1-C_6) alkoxy groups may be the same or different; di (C_1-C_6) alkoxythiophosphoryl groups whose (C_1-C_6) alkoxy groups may be the same or different; diphenylphosphino groups; diphenylphosphono groups; phenyl groups; substituted phenyl groups having one or more substituents which may be the same or different and are selected from halogen atoms, (C_1-C_6) alkyl groups, halo (C_1-C_6) alkyl groups, (C_1-C_6) alkoxy groups, halo (C_1-C_6) alkoxy groups, (C_1-C_6) alkylthio groups, halo (C_1-C_6) alkylthio groups, (C_1-C_6) alkylsulfinyl groups,

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halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; heterocyclic groups; substituted heterocyclic groups having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; or -A²-R⁵ (wherein A² is -O-, -S-, -SO-, -SO₂-, -N(R⁶)- (wherein R⁶ is a hydrogen atom; a (C₁-C₆)alkylcarbonyl group; a halo(C₁-C₆)alkylcarbonyl group; a (C₁-C₆)alkoxycarbonyl group; a phenylcarbonyl group; a substituted phenylcarbonyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; a phenyl(C₁-C₄)alkoxycarbonyl group; a substituted phenyl(C₁-C₄)alkoxycarbonyl group having on the ring one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-

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(C_1-C_6) alkylsulfinyl groups, halo(C_1-C_6)alkylsulfinyl groups, (C_1-C_6) alkylsulfonyl groups and halo(C_1-C_6)alkylsulfonyl groups; a (C_1-C_6) alkylsulfonyl group; or a halo(C_1-C_6)alkylsulfonyl group), $-C(=O)-$ or $-C(=NOR^7)-$ (wherein R^7 is a hydrogen atom; a (C_1-C_6) alkyl group; a halo(C_1-C_6)alkyl group; a (C_3-C_6) alkenyl group; a halo(C_3-C_6)alkenyl group; a (C_3-C_6) alkynyl group; a cyclo(C_3-C_6)alkyl group; a phenyl(C_1-C_4)alkyl group; or a substituted phenyl(C_1-C_4)alkyl group having on the ring one or more substituents which may be the same or different and are selected from halogen atoms, (C_1-C_6) alkyl groups, halo(C_1-C_6)alkyl groups, (C_1-C_6) alkoxy groups, halo(C_1-C_6)alkoxy groups, (C_1-C_6) alkylthio groups, halo(C_1-C_6)alkylthio groups, (C_1-C_6) alkylsulfinyl groups, halo(C_1-C_6)alkylsulfinyl groups, (C_1-C_6) alkylsulfonyl groups and halo(C_1-C_6)alkylsulfonyl groups), and R^5 is a hydrogen atom; a (C_1-C_6) alkyl group; a halo(C_1-C_6)alkyl group; a (C_3-C_6) alkenyl group; a halo(C_3-C_6)alkenyl group; a (C_3-C_6) alkynyl group; a halo(C_3-C_6)alkynyl group; a (C_3-C_6) cycloalkyl group; a halo(C_3-C_6)cycloalkyl group; a (C_1-C_6) alkoxy(C_1-C_6)alkyl group; a (C_1-C_6) alkylthio(C_1-C_6)alkyl group; a formyl group; a (C_1-C_6) alkylcarbonyl group; a halo(C_1-C_6)alkylcarbonyl group; a (C_1-C_6) alkoxycarbonyl group; a mono(C_1-C_6)alkylaminocarbonyl group; a di(C_1-C_6)alkylaminocarbonyl group whose (C_1-C_6) alkyl groups may be the same or different; a mono(C_1-C_6)alkylaminothiocarbonyl group; a di(C_1-C_6)alkylaminothiocarbonyl group

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whose (C₁-C₆)alkyl groups may be the same or different; a di(C₁-C₆)alkoxyphosphoryl group whose (C₁-C₆)alkoxy groups may be the same or different; a di(C₁-C₆)-alkoxythiophosphoryl group whose (C₁-C₆)alkoxy groups may be the same or different; a phenyl group; a substituted phenyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; a phenyl(C₁-C₄)alkyl group; a substituted phenyl(C₁-C₄)alkyl group having on the ring one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)-alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)-alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; a heterocyclic group; or a substituted heterocyclic group having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl

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groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups), and r is an integer of 1 to 4),

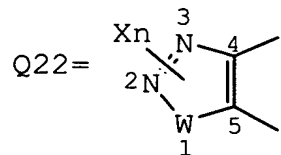
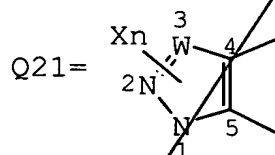
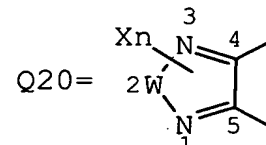
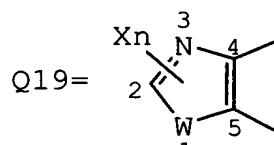
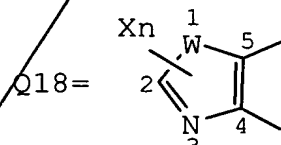
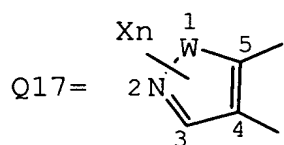
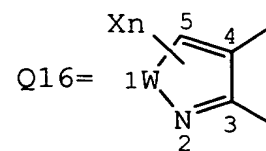
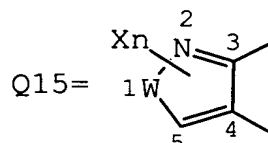
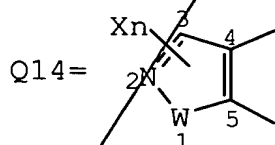
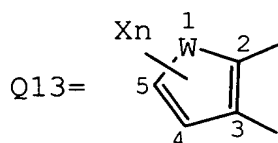
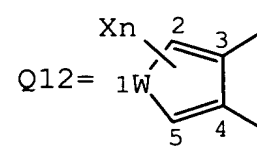
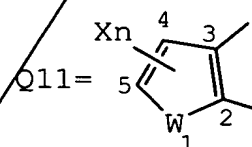
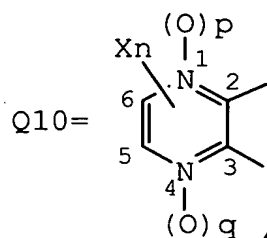
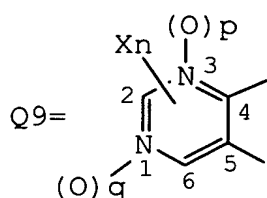
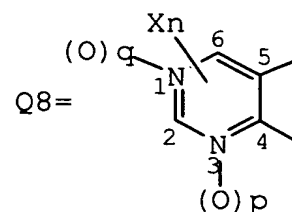
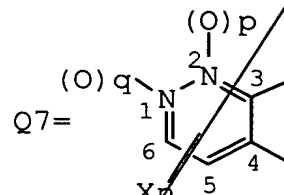
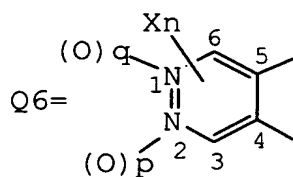
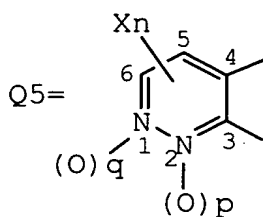
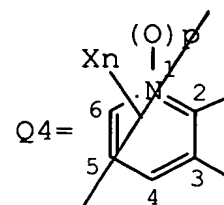
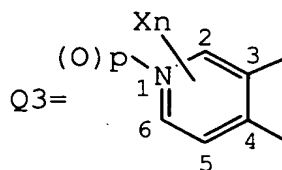
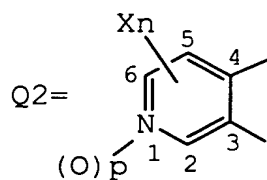
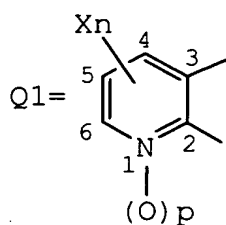
provided that R¹ and R² are not hydrogen atoms at the same time,

R¹ and R² may form a 4 to 7 membered ring by combining to each other, in which the ring may contain the same or different 1 to 3 hetero atoms selected from the group consisting of oxygen atom, sulfur atom and nitrogen atom,

Het is a heterocyclic group represented by any of the following formulas Q1 to Q22:

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(wherein X, which may be the same or different, are halogen atoms; cyano groups; nitro groups; (C₃-C₆)-cycloalkyl groups; halo(C₃-C₆)cycloalkyl groups; tri(C₁-C₆)alkylsilyl groups whose (C₁-C₆)alkyl groups may be the same or different; phenyl groups; substituted phenyl groups having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)-alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)-alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; heterocyclic groups; substituted heterocyclic groups having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)-alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)-alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; or -A³-R⁸ [wherein A³ is -O-, -S-, -SO-, -SO₂-, -N(R⁶)- (wherein R⁶ is as defined above), -C(=O)-, -C(=NOR⁷)- (wherein R⁷ is as defined above), a (C₁-C₆)-alkylene group, a halo(C₁-C₆)alkylene group, a (C₂-C₆)alkenylene group, a halo(C₂-C₆)alkenylene group, a (C₂-C₆)alkynylene group or a halo(C₃-C₆)alkynylene group, and R⁸ is as follows:

(1) when A³ is -O-, -S-, -SO-, -SO₂- or -N(R⁶)- (wherein

R^6 is as defined above), then R^8 is a halo(C_3 - C_6)cycloalkyl group; a halo(C_3 - C_6)cycloalkenyl group; a phenyl group; a substituted phenyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C_1 - C_6)alkyl groups, halo(C_1 - C_6)alkyl groups, (C_1 - C_6)alkoxy groups, halo(C_1 - C_6)alkoxy groups, (C_1 - C_6)alkylthio groups, halo(C_1 - C_6)alkylthio groups, (C_1 - C_6)alkylsulfinyl groups, halo(C_1 - C_6)alkylsulfinyl groups, (C_1 - C_6)alkylsulfonyl groups and halo(C_1 - C_6)alkylsulfonyl groups; a heterocyclic group; a substituted heterocyclic group having one or more substituents which may be the same or different and are selected from halogen atoms, (C_1 - C_6)alkyl groups, halo(C_1 - C_6)alkyl groups, (C_1 - C_6)alkoxy groups, halo(C_1 - C_6)alkoxy groups, (C_1 - C_6)alkylthio groups, halo(C_1 - C_6)alkylthio groups, (C_1 - C_6)alkylsulfinyl groups, halo(C_1 - C_6)alkylsulfinyl groups, (C_1 - C_6)alkylsulfonyl groups and halo(C_1 - C_6)alkylsulfonyl groups; or $-A^4-R^9$ (wherein A^4 is a (C_1 - C_6)alkylene group, a halo(C_1 - C_6)alkylene group, a (C_3 - C_6)alkenylene group, a halo(C_3 - C_6)alkenylene group, a (C_3 - C_6)alkynylene group or a halo(C_3 - C_6)alkynylene group, and R^9 is a hydrogen atom; a halogen atom; a (C_3 - C_6)cycloalkyl group; a halo(C_3 - C_6)cycloalkyl group; a (C_1 - C_6)alkoxycarbonyl group; a phenyl group; a substituted phenyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C_1 - C_6)alkyl groups, halo(C_1 - C_6)alkyl groups, (C_1 - C_6)alkoxy groups,

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~~halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups,
 halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups,
 halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl
 groups and halo(C₁-C₆)alkylsulfonyl groups; or -A⁵-R¹⁰
 (wherein A⁵ is -O-, -S-, -SO-, -SO₂- or -C(=O), and R¹⁰
 is a (C₁-C₆)alkyl group; a halo(C₁-C₆)alkyl group; a (C₃-
 C₆)alkenyl group; a halo(C₃-C₆)alkenyl group; a (C₃-C₆)-
 cycloalkyl group; a halo(C₃-C₆)cycloalkyl group; a
 phenyl group; a substituted phenyl group having one or
 more substituents which may be the same or different
 and are selected from halogen atoms, (C₁-C₆)alkyl
 groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups,
 halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups,
 halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups,
 halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl
 groups and halo(C₁-C₆)alkylsulfonyl groups; a hetero-
 cyclic group; or a substituted heterocyclic group
 having one or more substituents which may be the same
 or different and are selected from halogen atoms, (C₁-
 C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy
 groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio
 groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl
 groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkyl-
 sulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups)),
 (2) when A³ is -C(=O)- or -C(=NOR⁷)- (wherein R⁷ is as
 defined above), then R⁸ is a hydrogen atom; a (C₁-
 C₆)alkyl group; a halo(C₁-C₆)alkyl group; a (C₂-C₆)-
 alkenyl group; a halo(C₂-C₆)alkenyl group; a (C₃-C₆)-~~

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cycloalkyl group; a halo(C_3-C_6)cycloalkyl group; a (C_1-C_6)alkoxy group; a (C_1-C_6)alkylthio group; a mono(C_1-C_6)-alkylamino group; a di(C_1-C_6)alkylamino group whose (C_1-C_6)alkyl groups may be the same or different; a phenyl group; a substituted phenyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C_1-C_6)alkyl groups, halo(C_1-C_6)alkyl groups, (C_1-C_6)alkoxy groups, halo(C_1-C_6)alkoxy groups, (C_1-C_6)alkylthio groups, halo(C_1-C_6)-alkylthio groups, (C_1-C_6)alkylsulfinyl groups, halo(C_1-C_6)alkylsulfinyl groups, (C_1-C_6)alkylsulfonyl groups and halo(C_1-C_6)alkylsulfonyl groups; a phenylamino group; a substituted phenylamino group having on the ring one or more substituents which may be the same or different and are selected from halogen atoms, (C_1-C_6)alkyl groups, halo(C_1-C_6)alkyl groups, (C_1-C_6)alkoxy groups, halo(C_1-C_6)alkoxy groups, (C_1-C_6)alkylthio groups, halo(C_1-C_6)alkylthio groups, (C_1-C_6)alkylsulfinyl groups, halo(C_1-C_6)alkylsulfinyl groups, (C_1-C_6)alkylsulfonyl groups and halo(C_1-C_6)alkylsulfonyl groups; a heterocyclic group; or a substituted heterocyclic group having one or more substituents which may be the same or different and are selected from halogen atoms, (C_1-C_6)alkyl groups, halo(C_1-C_6)alkyl groups, (C_1-C_6)alkoxy groups, halo(C_1-C_6)alkoxy groups, (C_1-C_6)alkylthio groups, halo(C_1-C_6)alkylthio groups, (C_1-C_6)alkylsulfinyl groups, halo(C_1-C_6)alkylsulfinyl groups, (C_1-C_6)alkylsulfonyl groups and halo(C_1-C_6)alkylsulfonyl groups, and

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(3) when A^3 is a (C_1-C_6) alkylene group, a halo(C_1-C_6)alkylene group, a (C_2-C_6) alkenylene group, a halo(C_2-C_6)alkenylene group, a (C_2-C_6) alkynylene group or a halo(C_3-C_6)alkynylene group, then R^8 is a hydrogen atom; a halogen atom; a (C_3-C_6) cycloalkyl group; a halo(C_3-C_6)cycloalkyl group; a (C_1-C_6) alkoxycarbonyl group; a tri(C_1-C_6)alkylsilyl group whose (C_1-C_6) alkyl groups may be the same or different; a phenyl group; a substituted phenyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C_1-C_6) alkyl groups, halo(C_1-C_6)alkyl groups, (C_1-C_6) alkoxy groups, halo(C_1-C_6)alkoxy groups, (C_1-C_6) alkylthio groups, halo(C_1-C_6)alkylthio groups, (C_1-C_6) alkylsulfinyl groups, halo(C_1-C_6)alkylsulfinyl groups, (C_1-C_6) alkylsulfonyl groups and halo(C_1-C_6)alkylsulfonyl groups; a heterocyclic group; a substituted heterocyclic group having one or more substituents which may be the same or different and are selected from halogen atoms, (C_1-C_6) alkyl groups, halo(C_1-C_6)alkyl groups, (C_1-C_6) alkoxy groups, halo(C_1-C_6)alkoxy groups, (C_1-C_6) alkylthio groups, halo(C_1-C_6)alkylthio groups, (C_1-C_6) alkylsulfinyl groups, halo(C_1-C_6)alkylsulfinyl groups, (C_1-C_6) alkylsulfonyl groups and halo(C_1-C_6)alkylsulfonyl groups; or $-A^6-R^{11}$ (wherein A^6 is $-O-$, $-S-$, $-SO-$ or $-SO_2-$, and R^{11} is a (C_3-C_6) cycloalkyl group; a halo(C_3-C_6)cycloalkyl group; a phenyl group; a substituted phenyl group having one or more substituents which may be the same or different and are selected from halogen

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atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)-alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)-alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; a heterocyclic group; a substituted heterocyclic group having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; or -A⁷-R¹² (wherein A⁷ is a (C₁-C₆)-alkylene group, a halo(C₁-C₆)alkylene group, a (C₂-C₆)-alkenylene group, a halo(C₂-C₆)alkenylene group, a (C₂-C₆)alkynylene group or a halo(C₃-C₆)alkynylene group, and R¹² is a hydrogen atom; a halogen atom; a (C₃-C₆)cycloalkyl group; a halo(C₃-C₆)cycloalkyl group; a (C₁-C₆)-alkoxy group; a halo(C₁-C₆)alkoxy group; a (C₁-C₆)alkylthio group; a halo(C₁-C₆)alkylthio group; a (C₁-C₆)alkylsulfinyl group; a halo(C₁-C₆)alkylsulfinyl group; a (C₁-C₆)alkylsulfonyl group; a halo(C₁-C₆)alkylsulfonyl group; a phenyl group; a substituted phenyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio

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groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl
 groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkyl-
 sulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; a
 phenoxy group; a substituted phenoxy group having one
 or more substituents which may be the same or different
 and are selected from halogen atoms, (C₁-C₆)alkyl
 groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups,
 halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups,
 halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups,
 halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl
 groups and halo(C₁-C₆)alkylsulfonyl groups; a phenylthio
 group; a substituted phenylthio group having one or
 more substituents which may be the same or different
 and are selected from halogen atoms, (C₁-C₆)alkyl
 groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups,
 halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups,
 halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups,
 halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl
 groups and halo(C₁-C₆)alkylsulfonyl groups; a
 heterocyclic group; or a substituted heterocyclic group
 having one or more substituents which may be the same
 or different and are selected from halogen atoms, (C₁-
 C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy
 groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio
 groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl
 groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkyl-
 sulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups)],
 and n is an integer of 0 to 3,

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X may form a condensed ring by combining together with the adjacent atoms in the heterocyclic ring, and said condensed ring may have one or more substituents, which may be the same or different, and are selected from halogen atoms; (C₁-C₆)alkyl groups; halo(C₁-C₆)alkyl groups; (C₁-C₆)alkoxy groups; halo(C₁-C₆)alkoxy groups; (C₁-C₆)alkylthio groups; halo(C₁-C₆)alkylthio groups; (C₁-C₆)alkylsulfinyl groups; halo(C₁-C₆)alkylsulfinyl groups; (C₁-C₆)alkylsulfonyl groups; halo(C₁-C₆)alkylsulfonyl groups; phenyl group; substituted phenyl groups having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; heterocyclic groups; and substituted heterocyclic groups having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups,

W is O, S or N-R¹³ (wherein R¹³ is a (C₁-C₆)-alkyl group; a halo(C₁-C₆)alkyl group; a (C₃-C₆)alkenyl

group; a halo(C₃-C₆)alkenyl group; a (C₃-C₆)alkynyl group; a halo(C₃-C₆)alkynyl group; a (C₁-C₆)alkoxy group; a phenyl group; a substituted phenyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; a phenyl(C₁-C₆)alkyl group; or a substituted phenyl(C₁-C₆)alkyl group having on the ring one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups), and p and q, which may be the same or different, are integers of 0 to 1),

B¹, B², B³ and B⁴, which may be the same or different, are carbon atoms or nitrogen atoms,

Y, which may be the same or different, are halogen atoms; cyano groups; nitro groups; halo(C₃-C₆)-cycloalkyl groups; phenyl groups; substituted phenyl groups having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)-

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B³

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B3

alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; heterocyclic groups; substituted heterocyclic groups having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; or -A³-R⁸ (wherein A³ and R⁸ are as defined above), and m is an integer of 1 to 5,

Y may form a condensed ring by combining together with the adjacent carbon atoms in the aromatic ring, and said condensed ring may have one or more substituents, which may be the same or different, and are selected from halogen atoms; (C₁-C₆)alkyl groups; halo(C₁-C₆)alkyl groups; (C₁-C₆)alkoxy groups; halo(C₁-C₆)alkoxy groups; (C₁-C₆)alkylthio groups; halo(C₁-C₆)alkylthio groups; (C₁-C₆)alkylsulfinyl groups; halo(C₁-C₆)alkylsulfinyl groups; (C₁-C₆)alkylsulfonyl groups; halo(C₁-C₆)alkylsulfonyl groups; phenyl group; substituted phenyl groups having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-

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1. The first group of people who are interested in the results of the study are the researchers themselves. They want to know how well the study was conducted and whether the results are reliable and valid. They also want to know how the study can be used to inform future research and practice.

(1) when Het is Q2, Q6, Q7 or Q9 and B¹, B², B³ and B⁴ are carbon atoms at the same time, then Ym is other than 3-chloro-2-methyl group, 3-chloro-2,6-diethyl group, 5-chloro-2-methyl group, 2,6-diethyl group, 4-chloro-2-fluoro group and 2-ethyl-6-methyl group,

(2) when Het is Q4 and B¹, B², B³ and B⁴ are carbon atoms at the same time, then Ym is other than 2,5-dichloro group, 2,4-difluoro group, 2,6-difluoro group, 3-chloro-2-methyl group, 5-chloro-2-methyl group, 5-fluoro-2-methyl group, 2,6-dimethyl group, 2,6-diethyl group, 2-ethyl-6-methyl group, 2-methoxy-5-nitro group, 2-methoxy-5-methyl group, 2,6-diethoxy group, 3-bromo-2-methyl group, 3-fluoro-2-methyl group, 3-iodo-2-methyl group, 3-cyano-2-methyl group, 3-difluoro-

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B3

methoxy-2-methyl group, 5-chloro-2-ethyl group, 2,5-dimethyl group, 2,3-dichloro group, 3-chloro-2,6-diethyl group, 4-trifluoromethyl group, 3-methoxycarbonyl-2-methyl group, 3-trifluoromethyl-2-methyl group, 3,5-dichloro-2,6-diethyl group, 3,4-dichloro group, 3-(methoxycarbonylmethoxy)-2-methyl group, 2-methyl-3-nitro group and 4-trifluoromethoxy group,

(3) when Het is Q9, R^2 and R^3 are hydrogen atoms at the same time, X_n is a 2-phenyl group, R^1 is a n-propyl group or an i-propyl group and B^1 , B^2 , B^3 and B^4 are carbon atoms at the same time, then Y_m is other than 4-pentafluoroethyl-2-methyl group, and

(4) when Het is Q10 and B^1 , B^2 , B^3 and B^4 are carbon atoms at the same time, then Y_m is other than 5-chloro-2-methyl group, 5-fluoro-2-methyl group and 2,5-dimethyl group}.

2. A heterocyclic dicarboxylic acid diamide derivative according to claim 1, wherein Het is Q1, Q2, Q3 or Q4, R^1 is a (C_3-C_6) cycloalkyl group, a halo (C_3-C_6) cycloalkyl group or $-A^1-(R^4)_r$ (wherein A^1 is a (C_1-C_8) -alkylene group, R^4 , which may be the same or different, are hydrogen atoms; halogen atoms; cyano groups; nitro groups; (C_1-C_6) alkoxycarbonyl groups; di (C_1-C_6) alkoxyphosphoryl groups whose (C_1-C_6) alkoxy groups may be the same or different; di (C_1-C_6) alkoxythiophosphoryl groups whose (C_1-C_6) alkoxy groups may be the same or different; phenyl groups; substituted phenyl groups having one or more substituents which may be the same or different

and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; pyridyl groups; substituted pyridyl groups having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; or -A²-R⁵ (wherein A² is -O-, -S-, -SO-, -SO₂-, -N(R⁶)- (wherein R⁶ is a hydrogen atom, a (C₁-C₆)alkylcarbonyl group, a halo(C₁-C₆)alkylcarbonyl group or a (C₁-C₆)alkoxycarbonyl group), or -C(=NOR⁷)- (wherein R⁷ is a hydrogen atom, a (C₁-C₆)alkyl group or a halo(C₁-C₆)alkyl group), and R⁵ is a hydrogen atom; a (C₁-C₆)alkyl group; a halo(C₁-C₆)alkyl group; a (C₁-C₆)cycloalkyl group; a halo(C₁-C₆)cycloalkyl group; a phenyl group; a substituted phenyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkyl-

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sulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; a pyridyl group; or a substituted pyridyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups), and r is an integer of 1 to 4), R² and R³, which may be the same or different, are hydrogen atoms or (C₁-C₆)alkyl groups, X and Y, which may be the same or different, are halogen atoms; cyano groups; nitro groups; phenyl groups; substituted phenyl groups having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; pyridyl groups; substituted pyridyl groups having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups;

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groups and halo(C₁-C₆)alkylsulfonyl groups; or -A³-R⁸ [wherein A³ is -O-, -S-, -SO-, -SO₂-, a (C₁-C₆)alkylene group, a halo(C₁-C₆)alkylene group, a (C₂-C₆)alkenylene group, a halo(C₂-C₆)alkenylene group, a (C₂-C₆)alkynylene group or a halo(C₃-C₆)alkynylene group, and R⁸ is as follows:

(1) when A³ is -O-, -S-, -SO- or -SO₂-, then R⁸ is a phenyl group; a substituted phenyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; a pyridyl group; a substituted pyridyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; or -A⁴-R⁹ (wherein A⁴ is a (C₁-C₆)alkylene group, a halo(C₁-C₆)alkylene group, a (C₃-C₆)alkenylene group, a halo(C₃-C₆)alkenylene group, a (C₃-C₆)alkynylene group or a halo(C₃-C₆)alkynylene group, and R⁹ is a hydrogen atom, a halogen atom or -A⁵-R¹⁰ (wherein A⁵ is -O-, -S-, -SO- or

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-SO₂-, and R¹⁰ is a (C₁-C₆)alkyl group, a halo(C₁-C₆)alkyl group, a (C₃-C₆)alkenyl group, a halo(C₃-C₆)alkenyl group, a (C₃-C₆)cycloalkyl group or a halo(C₃-C₆)cycloalkyl group)), and

(2) when A³ is a (C₁-C₆)alkylene group, a halo(C₁-C₆)alkylene group, a (C₂-C₆)alkenylene group, a halo(C₂-C₆)alkenylene group, a (C₂-C₆)alkynylene group or a halo(C₃-C₆)alkynylene group, then R⁸ is a hydrogen atom; a halogen atom; a (C₃-C₆)cycloalkyl group; a halo(C₃-C₆)cycloalkyl group; a tri(C₁-C₆)alkylsilyl group whose (C₁-C₆)alkyl groups may be the same or different; a phenyl group; a substituted phenyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; a pyridyl group; a substituted pyridyl group having one or more substituents which may be the same or different and are selected from halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, (C₁-C₆)alkylsulfinyl groups, halo(C₁-C₆)alkylsulfinyl groups, (C₁-C₆)alkylsulfonyl groups and halo(C₁-C₆)alkylsulfonyl groups; or -A⁶-R¹¹ (wherein A⁶ is -O-, -S-, -SO- or -SO₂-, and R¹¹ is -A⁷-R¹²

(wherein A⁷ is a (C₁-C₆)alkylene group, a halo(C₁-C₆)-alkylene group, a (C₂-C₆)alkenylene group, a halo(C₂-C₆)-alkenylene group, a (C₂-C₆)alkynylene group or a halo(C₃-C₆)alkynylene group, and R¹² is a hydrogen atom, a halogen atom, a (C₁-C₆)alkoxy group, a halo(C₁-C₆)alkoxy group, a (C₁-C₆)alkylthio group, a halo(C₁-C₆)alkylthio group, a (C₁-C₆)alkylsulfinyl group, a halo(C₁-C₆)alkylsulfinyl group, a (C₁-C₆)alkylsulfonyl group or a halo(C₁-C₆)alkylsulfonyl group)]], both B¹ and B⁴ are carbon atoms, B² and B³, which may be the same or different, are carbon atoms or nitrogen atoms, and each of Z¹ and Z² is an oxygen atom.

3. A heterocyclic dicarboxylic acid diamide derivative according to claim 2, wherein X, which may be the same or different, are halogen atoms, nitro groups, halo(C₁-C₆)alkyl groups, halo(C₁-C₆)alkoxy groups or halo(C₁-C₆)alkylthio groups, and n is an integer of 0 to 3.

4. A heterocyclic dicarboxylic acid diamide derivative according to claim 3, wherein Y, which may be the same or different, are halogen atoms, (C₁-C₆)alkyl groups, halo(C₁-C₆)-alkyl groups, (C₁-C₆)alkoxy groups, halo(C₁-C₆)alkoxy groups, (C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylthio groups, halo(C₁-C₆)-alkoxyhalo(C₁-C₆)alkoxy groups, halo(C₁-C₆)-alkoxyhalo(C₁-C₆)alkylthio groups, halo(C₁-C₆)alkylsulfinyl groups or halo(C₁-C₆)alkylsulfonyl groups, and m is an integer of 1 to 5.

5. A heterocyclic dicarboxylic acid diamide derivative according to claim 4, wherein R^1 is a (C_1-C_6) alkyl group, a (C_1-C_6) alkoxy (C_1-C_8) alkyl group, a (C_1-C_6) alkylthio (C_1-C_8) -alkyl group, a (C_1-C_6) alkylsulfinyl (C_1-C_8) alkyl group or a (C_1-C_6) alkylsulfonyl (C_1-C_8) alkyl group, and R^2 and R^3 , which may be the same or different, are hydrogen atoms or methyl groups.

8. ~~An agricultural and horticultural insecticide characterized by containing a heterocyclic dicarboxylic acid diamide derivative according to any one of claims 1 to 5 as an active ingredient.~~

7. A method for applying an agricultural and horticultural insecticide, characterized by treating a crop to be protected or soil with an effective amount of an agricultural and horticultural insecticide according to claim 6 in order to protect useful crops against insect pests.

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